MOTOMAN-MA1440, MH12 OPTIONS
INSTRUCTIONS
FOR OPTIONAL CABLE SETTING UP/REMOVING PROCEDURES
TYPE: YR-MA1440/MH12-A** (WITH CABLE FOR ARC WELDING (OPTION))

Upon receipt of the product and prior to initial operation, read these instructions below thoroughly, and retain for future reference.

The DX200 operator's manual above corresponds to specific usage. Be sure to use the appropriate manual.

Part Number: 167775-1CD
Revision: 0
MANDATORY

• MOTOMAN-MA1440, MH12 OPTIONS INSTRUCTIONS FOR OPTIONAL CABLE SETTING UP/REMOVING PROCEDURES are intended to explain detailed specifications and maintenance procedures of the manipulator with the drive unit of the manipulator on the center for the purpose of appropriate application of this system and maintenance procedures to the manipulator. Read through this instruction before operation.

• General items related to safety are listed in Chapter 1: Safety of the DX200 Instructions. To ensure correct and safe operation, carefully read the DX200 Instructions before reading this manual.

CAUTION

• Some drawings in this manual are shown with the protective covers or shields removed for clarity. Be sure all covers and shields are replaced before operating this product.

• The drawings and photos in this manual are representative examples and differences may exist between them and the delivered product.

• YASKAWA may modify this model without notice when necessary due to product improvements, modifications, or changes in specifications.

• If such modification is made, the manual number will also be revised.

• If your copy of the manual is damaged or lost, contact a YASKAWA representative to order a new copy. The representatives are listed on the back cover. Be sure to tell the representative the manual number listed on the front cover.

• YASKAWA is not responsible for incidents arising from unauthorized modification of its products. Unauthorized modification voids your product's warranty.
Notes for Safe Operation

Read this manual carefully before installation, operation, maintenance, or inspection of the DX200.

In this manual, the Notes for Safe Operation are classified as “WARNING”, “CAUTION”, “MANDATORY”, or “PROHIBITED”.

⚠️ WARNING
- Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury to personnel.

⚠️ CAUTION
- Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury to personnel and damage to equipment. It may also be used to alert against unsafe practices.

❗️ MANDATORY
- Always be sure to follow explicitly the items listed under this heading.

⛔️ PROHIBITED
- Must never be performed.

Even items described as “CAUTION” may result in a serious accident in some situations.

At any rate, be sure to follow these important items:

To ensure safe and efficient operation at all times, be sure to follow all instructions, even if not designated as "CAUTION" and "WARNING".
WARNING

• Before operating the manipulator, check that servo power is turned OFF pressing the emergency stop buttons on the front door of the DX200 and the programming pendant. When the servo power is turned OFF, the SERVO ON LED on the programming pendant is turned OFF.

Injury or damage to machinery may result if the emergency stop circuit cannot stop the manipulator during an emergency. The manipulator should not be used if the emergency stop buttons do not function.

*Figure 1: Emergency Stop Button*

• Once the emergency stop button is released, clear the cell of all items which could interfere with the operation of the manipulator. Then turn the servo power ON.

Injury may result from unintentional or unexpected manipulator motion.

*Figure 2: Release of Emergency Stop*

• Observe the following precautions when performing teaching operations within the P-point maximum envelope of the manipulator:
  – View the manipulator from the front whenever possible.
  – Always follow the predetermined operating procedure.
  – Keep in mind the emergency response measures against the manipulator’s unexpected motion toward you.
  – Ensure that you have a safe place to retreat in case of emergency.

Improper or unintended manipulator operation may result in injury.

• Confirm that no person is present in the P-point maximum envelope of the manipulator and that you are in a safe location before:
  – Turning ON the power for the DX200.
  – Moving the manipulator with the programming pendant.
  – Running the system in the check mode.
  – Performing automatic operations.

Injury may result if anyone enters the P-point maximum envelope of the manipulator during operation. Always press an emergency stop button immediately if there is a problem.

The emergency stop buttons are located on the right of front door of the DX200 and the programming pendant.
Definition of Terms Used Often in This Manual

The MOTOMAN is the YASKAWA industrial robot product.
The MOTOMAN usually consists of the manipulator, the controller, the programming pendant, and the manipulator cables.

In this manual, the equipment is designated as follows:

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Manual Designation</th>
</tr>
</thead>
<tbody>
<tr>
<td>DX200 controller</td>
<td>DX200</td>
</tr>
<tr>
<td>DX200 programming pendant</td>
<td>Programming pendant</td>
</tr>
<tr>
<td>Cable between the manipulator and the DX200</td>
<td>Manipulator cable</td>
</tr>
</tbody>
</table>
Explanation of Warning Labels

The following warning labels are attached to the manipulator.
Always follow the warnings on the labels.
Also, an identification label with important information is placed on the body of the manipulator. Prior to operating the manipulator, confirm the contents.

*Figure 3: Warning Label Locations*
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1 Arc Welding Cable Setting-Up/Removing Procedures

- Refer to Fig. 1-1 "Setting Up/Removing Procedures of Cable for Arc Welding".

### Set-up

1. Turn OFF the DX200 power supply.
2. Unscrew the GT-SA bolts from the S-head and then, remove the cover.
3. Unscrew the GT-SA bolts from the S-head and then, remove the cover.
4. Attach the terminal block to the S-head with the hexagon socket head cap screws. And then, tighten the screws with the tightening torque shown in Table 1-1 "Cable Parts for Arc Welding Check List".
5. For the effective operation, unscrew the GT-SA bolts and remove the support.
6. Unscrew the cross-recessed pan head machine screws and remove the cover.
7. Apply grease (Multemp PS2A) to the sliding surface of the wire protecting spring at the wire harness in the manipulator.
8. Pass the wire harness in the manipulator from inside of the base to the S-head side. When passing the wire harness, following points are to be noted.
   - Be careful that the existing air hoses or grease hoses inside the base would not be bent.
   - Keep away the round terminals of the wire harness in the manipulator to be connected to the terminal block from the grease by protecting them with covers, etc.
9. Mount the cover of the wire harness in the manipulator to the connector base with the cross-recessed pan head machine screws.
10. Mount the clamp to the support with the cross-recessed pan head machine screws.
11. Fix the wire harness in the manipulator, which were passed from inside of the base to the S-head side, to the clamp by using the cable tie. And then, fix the saddle to the support by using the hexagon socket head cap screws. Tighten the screws with the tightening torque shown in Table 1-1.
12. Mount the support, to which the wire harness in the manipulator are fixed, to the S-head with the GT-SA bolts. Tighten the bolts with the tightening torque shown in Table 1-1.
13. Mount the support, which was removed for the effective operation, to the S-head with the GT-SA bolts. Tighten the bolts with the tightening torque shown in Table 1-1.
14. Attach the round terminals of the wire harness in the manipulator to the terminal block with the M10 nut and the spring washers which were delivered with the terminal block.
15. Connect the joint, which is delivered with the wire harness in the manipulator, to the air hose of the wire harness in the manipulator.
Arc Welding Cable Setup and Removal

1. Arc Welding Cable Setting-Up/Removing Procedures

16. Mount the cover to the S-head with the GT-SA bolts. Tighten the bolts with the tightening torque shown in Table 1-1 "Cable Parts for Arc Welding Check List".

17. Mount the cover to the S-head by using the GT-SA bolts. Tighten the bolts with the tightening torque shown in Table 1-1.

- Removal

1. Turn OFF the DX200 power supply.

2. Unscrew the GT-SA bolts from the S-head and remove the cover.

3. Unscrew the GT-SA bolts from the S-head and remove the cover.

4. Remove the round terminal of the wire harness in the manipulator from the terminal block.

5. Unscrew the hexagon socket head cap screws and remove the terminal block from the S-head.

6. Remove the joint from the wire harness in the manipulator.

7. Unscrew the GT-SA bolts and remove the support, to which the wire harness in the manipulator is attached, from the S-head.

8. Cut the cable tie, which is fixing the wire harness in the manipulator to the clamp. And then, unscrew the hexagon socket head cap screws to remove the saddle from the support.

9. Unscrew the cross-recessed pan head machine screws, pull the wire harness in the manipulator from the S-head side to the base side, and then remove the wire harness in the manipulator.

10. Mount the cover to the connector base with the cross-recessed pan head machine screws.

11. Mount the cover to the S-head with the GT-SA bolts. Tighten the bolts with the tightening torque shown in Table 1-1.

12. Mount the cover to the S-head with the GT-SA bolts. Tighten the bolts with the tightening torque shown in Table 1-1.
Table 1-1: Cable Parts for Arc Welding Check List

<table>
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<tr>
<th>No</th>
<th>Item</th>
<th>Qty</th>
<th>Remark</th>
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<tbody>
<tr>
<td>1</td>
<td>S-head HW1100499-1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>GT-SA bolt M6 (length: 15 mm)</td>
<td>8</td>
<td>Tightening Torque 10 N•m</td>
</tr>
<tr>
<td>3</td>
<td>Cover HW1303254-1</td>
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</tr>
<tr>
<td>4</td>
<td>GT-SA bolt M6 (length: 15 mm)</td>
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<td>Tightening Torque 10 N•m</td>
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<tr>
<td>5</td>
<td>Cover HW1303255-1</td>
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<td></td>
</tr>
<tr>
<td>6</td>
<td>Terminal block TS200CHM</td>
<td>1</td>
<td>The M10 nut and the spring washers are delivered with.</td>
</tr>
<tr>
<td>7</td>
<td>Hexagon Socket Head Cap Screw M5 (length: 16 mm)</td>
<td>2 each</td>
<td>Tightening Torque 3.0 N•m</td>
</tr>
<tr>
<td>8</td>
<td>Conical Spring Washer 2H-5</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>GT-SA bolt M6 (length: 15 mm)</td>
<td>2</td>
<td>Tightening Torque 10 N•m</td>
</tr>
<tr>
<td>10</td>
<td>Support HW0414670-2</td>
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<td>11</td>
<td>Cross-Recessed Pan Head Machine Screw M4 (length: 10 mm)</td>
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<td>12</td>
<td>Cover HW0415042-1</td>
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<td>Wire Harness in Manipulator HW1470730-B</td>
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<td>14</td>
<td>Base HW1100498-1</td>
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<tr>
<td>15</td>
<td>Connector Base HW0314612-1</td>
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<td>16</td>
<td>Support HW0414670-1</td>
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<td>17</td>
<td>Clamp TA1-S10</td>
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<td>18</td>
<td>Cross-Recessed Pan Head Machine Screw M5 (length: 8 mm)</td>
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<td>19</td>
<td>Cable Tie T50R</td>
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<td>20</td>
<td>Saddle CD31</td>
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<tr>
<td>21</td>
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<td>Tightening Torque 6.0 N•m</td>
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<td>22</td>
<td>Conical Spring Washer 2H-5</td>
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<tr>
<td>23</td>
<td>GT-SA bolt M6 (length: 15 mm)</td>
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<td>Tightening Torque 10 N•m</td>
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<td>24</td>
<td>Joint KQL10-00</td>
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<td>25</td>
<td>Wire Harness in Manipulator HW1171418-A</td>
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Fig. 1-1: Setting Up/Removing Procedures of Cable for Arc Welding
Specifications are subject to change without notice for ongoing product modifications and improvements.